

CLAIMS

What is claimed is:

1. A method of optically scanning a pneumatic tire of a vehicle wheel rotatably mounted on a stationary axis, the method comprising the steps of:
 - emitting at least one light beam from at least one given position onto the surface of the pneumatic tire;
 - at least at one given position, receiving at least one beam reflected by the surface of the pneumatic tire corresponding to the at least one light beam; and
 - determining dimensions and positions of the pneumatic tire or constituent parts of the pneumatic tire based on the respective directions of the at least one emitted light beam and the at least one reflected beam.
2. The method according to claim 1, wherein one of the at least one beam scans the tread surface of the pneumatic tire.
3. The method according to claim 2, wherein the profile depth and/or irregular tire wear are ascertained when scanning the tread surface.
4. The method according to one of claim 3, wherein the tread surface of the pneumatic tire is scanned to determine unacceptable conicity.
5. The method according to claim 1, wherein the at least one beam scans a tire side wall or both tire side walls of the wheel.
6. The method according to claim 5 further comprising the step of detecting the tire fit on the tire rim and/or indentations and/or bulges at one or both tire side walls of the wheel, based on the respective directions of the at least one emitted light beam and the at least one reflected beam.
7. An apparatus for optically scanning a pneumatic tire of a vehicle wheel that is rotatably mounted on a measuring shaft of a wheel balancing machine, comprising:
 - at least one light source that emits a light beam directed to the surface of the pneumatic tire;

a receiver movable together with the light source and configured to receive a beam reflected by the surface of the pneumatic tire, and produce a signal based on the receiving position of the reflected signal at the receiver, wherein the light source and the receiver and the light source are movable together into given positions relative to the measuring shaft;

a rotary angle sensor, coupled to the measuring shaft, for generating rotary angle signals based on the rotation of the measuring shaft and the vehicle wheel; and

a computer-aided evaluation device, coupled to the rotary angle sensor and the receiver, for ascertaining dimensions and positions of the pneumatic tire or constituent parts of the pneumatic tire based on the signals received from the receiver and the rotary angle sensor.

8. The apparatus according to claim 7 comprising three sensor devices, each of the three sensor devices includes the light source and the receiver, wherein:

one of the sensor devices is configured to scan the tire tread surface, and the other two of the sensor devices are configured to scan the tire side walls at the inside and the outside of the wheel, and

the sensor devices are attached to movably components of a wheel balancing machine.

9. A method using one or more light beams for optically scanning a pneumatic tire of a vehicle wheel that is rotatably mounted to a stationary axis, in which a light beam is directed from at least one given position on to the surface of the pneumatic tire, and an associated reflected beam is received at least one given position, wherein dimensions and positions of the pneumatic tire or constituent parts of the pneumatic tire are ascertained based on the directions of the emitted light beam and the reflected beam.